



## 1. Introduction

Financial integration is of particular interest to both economists and investors. Indeed, economists analyze and measure the degree of financial markets integration in order to understand the forces that drive this process, while investors rather seek to cover risks and diversify their portfolio by investing in different stock markets; Tai, 2007 and Ibrahim, 2005. In economic theory, economic integration begins with a free trade area that is an area in which member countries eliminate tariffs on intra-trade. Then, it steps up a common market by facilitating the free movement of factors and goods, thereby increasing trade between the countries of the union. Subsequently to allow a more intense exchange of factors and goods, the common market may be transformed into a monetary union in order to facilitate transactions among member states. One of the main consequences of these different steps of economic integration may also lead to financial integration. Financial integration results in lower profitability differences of financial assets from a country to another, and thus reduces investors' opportunity to diversify their portfolio to hedge against risk, Ibrahim, 2005.

There are several economic regional integration around the world, which according to their level of evolution give rise to significant financial integration between the various financial centers of member countries. Among these economic integrations, ASEAN (Association of South East Asian Nations) is one of the most successful one, with a trade level comparable to that of the euro area (when considering ASEAN+3, i.e. China, Korea and Japan). This strong economic integration has raised many questions in the level of financial integration of the region. Thus, Barus 1997 studies cointegration between the Indonesian capital market and that of the four other ASEAN founding members, namely Malaysia, the Philippines, Thailand and Singapore. His results show a low degree of integration between 1985 and 1995. Similarly, Hee, 2002 also studies markets interlinkages among ASEAN countries. Although he finds no long-term relationship among ASEAN countries' financial markets, he still shows a growing integration of these markets. Again, Palac-McMiken, 1997 shows that Malaysia, the Philippines, Thailand and Singapore are related during this period. Similarly, Wongbangpo, 2000; Azman-Saini et al, 2002; Cheng et al., 2003; Click and Plummer, 2005 also show some co-movements and a clear long-term co-integration relationship between the stock markets of ASEAN countries. Especially, this interdependence of the ASEAN countries' stock markets increased after the Asian crisis of 1997, as evidenced by Daly, 2003.

Furthermore, other studies have focused on the integration of financial markets between ASEAN and other countries in South East Asia or other countries with strong commercial ties with the union. Indeed, Ibrahim, 2000 finds a strong integration between ASEAN countries and the US. More specifically, he finds that USA exercises a strong influence on these markets. Similarly, Dunnis and Shannon, 2005 study the integration between ASEAN countries, Central Asian countries (like Korea, Taiwan, China and India) with the Japanese, American and British stock markets after the 1997 crisis. They find that the level of integration between the Asian markets increases with the Japanese market; while integration with the US and UK remained stable or decreased. Unlike most of the cited studies which used the cointegration or co-movement analyses, Shabri et al, 2008 use a two steps methodology coupling cointegration and Generalized Method Moments (GMM). With this more robust method, the authors question how strong was the influence of Japanese and US stock markets on ASEAN stock markets. They find various degrees of integration of these

major economic partners with the ASEAN countries. In fact, their results show that Indonesia is Relatively independent of both USA and Japan; Malaysia and Thailand are more dependent on Japan rather than USA; while the Philippines is more affected by USA than Japan. And finally, USA and Japan have bidirectional Granger causalities with Singapore.

In our study, we focus more specifically on the recent evolution of stock markets integration (from 2000-2014) of Japan with ASEAN +5 (ASEAN + Australia, Korea, China, USA and Japan), using an innovating method. Indeed, unlike other methods used in previous studies, the international capital asset pricing model (ICAPM), has the specificity that the expected return on an asset depends on both the global systematic risk and the local systematic risk. This allows having a measure of the intensity of financial integration. In addition, with this ICAPM, we apply a parsimonious multivariate DCC-GARCH process. The advantage is that it can identify common risk factors affecting stock returns, risks premia associated with these factors, and therefore the dynamics of financial integration, Guesmi and Nguyen, 2014. It also allows integrating exchange rate risks within financial integration dynamics. Thus, it will allow us to consider exchange rate strategies in the region, taking into account the yen fluctuations.

Our study is of interest in the framework of ASEAN financial integration because the Japan has strong commercial links with ASEAN, as a matter of fact, it is the first destination and origin respectively for ASEAN's exports and imports in the region. These intense trading ties may play a role in stock markets integration between ASEAN and Japan. Indeed, Japan has been for a long period of time, an East Asian giant, with a great financial place in the region. As for ASEAN countries, most of them have undertaken financial reforms to modernize and liberalize their markets. Several studies have already questioned the impact of these reforms on the level of integration of these markets with the international financial market, Bekaert and Harvey, 1995; De Santis and Imrohorglu, 1997. However, after the Asian crisis of 1997 and the crisis in the early 90s in Japan (followed by a two decade-recession), it still remains relevant to question the effect of these changes on the financial integration of Japan with ASEAN countries. Lastly, our study is of particular interest for private investors seeking diversification, but also for economic policy. Because, it allows knowing the level of integration of Japan and ASEAN +5, and the impact of financial reforms implemented by the ASEAN countries on this financial integration.

Our results show that the degree of integration between Japan and ASEAN countries has significantly increased in recent years. This is most likely the result of intensified trade between Japan and ASEAN countries since the ASEAN + 3 and ASEAN + 5 agreements. But this growing integration is also due to the concentration of financial transactions on a limited number of very dynamic financial centers such as Tokyo, Shanghai, Hong Kong and Seoul. However, the level of integration achieved does not lay the foundation for a monetary union in Southeast Asia.

The remaining of our article is organized as follows. Section 2 presents the partially integrated conditional ICAPM model and the DCC-GARCH used to answer the research question. Section 3 presents the data used. Section 4 analyzes the results. Finally, Section 5 draws some implications for exchange rate regimes of ASEAN countries.

The remainder of the article is organized as follows. Section 2 presents a partially integrated conditional ICAPM model. Section 3 describes the data. Section 4 reports and discusses the obtained results. Section 5 provides some concluding remarks.

## 2. The Model

A long literature finds evidence of partial integration of both developed and emerging markets to the world market. Our empirical asset pricing model resembles that of Bekaert and Harvey (1995) and is based on the theoretical models of partial integration of Black (1974), Stulz (1981), Errunza and Losq (1985), Eun and Janakiraman (1986) and Cooper and Kaplanis (2000). We adopt a partially integrated conditional ICAPM with three sources of systematic risk that globally reflect fluctuations in regional stock market, national stock market, and exchange rate. The conditional mean excess return can be written as

$$E(R_{j,t}|\pi_{t-1}) = c_0 + \Theta_{t-1}[\eta_{reg}Cov(R_{j,t}, R_{reg,t}|\pi_{t-1}) + \eta_kCov(R_{j,t}, R_{k,t}|\pi_{t-1})] \\ + (1 - \Theta_{t-1})\eta_l Var(R_{j,t}|\pi_{t-1}) + \varepsilon_{j,t} \quad (1)$$

with

$$\varepsilon_t \sim \mathcal{N}(0, H_t)$$

$R_{j,t}$ ,  $R_{reg,t}$  and  $R_{k,t}$  are respectively expected excess returns on the local market portfolio, the excess return on *Asia Pacific region* (*ASEAN + Australia, Korea, China, USA and Japan*) and the excess currency return, conditionally on a set of information  $\pi_{t-1}$  that is available to investors up to time  $t-1$ .  $\eta_{reg}$ ,  $\eta_l$  and  $\eta_k$  are the expected prices of a unit of risk, related to the regional market, the local market and the currency risk, respectively.

$\Theta_{t-1}$  refers to a conditional measure of financial integration degree of Japan market with the regional market with  $\Theta_{t-1} = e^{(-|\alpha'F_{t-1}|)}$ . A market is fully integrated into the regional market when  $\Theta_{t-1} = 1$  and, in this case; the expected return on Japan market depends upon its covariance with regional stock market and exchange rate returns. Thus, the model in Eq. (1) becomes the two-factor regional CAPM allowing for deviations from purchasing power parity (PPP). If  $\Theta_{t-1} = 0$ , Japan market is completely segmented from the regional market. The expected return is therefore determined uniquely with respect to the local market risk and the model in Eq. (1) is reduced to the domestic CAPM. When  $\Theta_{t-1}$  is comprised between 0 and 1, Japan market is in a situation of partial integration with the regional market and asset-pricing relationship is based on a combination of regional, local and exchange rate risk factors.

$H_t$  is the conditional variance-covariance matrix of excess returns. We model  $H_t$  by using a multivariate GARCH-DCC model of Engle (2002).

The parameters are estimated by maximum likelihood, assuming conditional normally distributed errors. To avoid problems due to non-normality in excess returns, we provide quasi-maximum likelihood (QML) estimates, as proposed by Bollerslev et al. (1992), which are robust to departures from normality.

## 3. Data

We use monthly data over the period from January 1996 through December 2012. The dataset includes returns series, real exchange rates, and various variables that are likely to affect the degree of financial market integration. We give more details about our dataset in what follows.

### *-Returns*

Our dataset consists of monthly time series related to stock market indices, exchange rates, as well as global, regional and local economic and financial variables. The use of monthly frequency is a common feature among the studies focusing on financial market integration which is a relatively long-run phenomenon. Using monthly data thus allows us not only to have sufficient data points to make reliable statistical inferences, but also to compare our results with those of previous studies. Also, as noted by Harvey (1991), monthly data help reduce potential biases that may arise from emerging market imperfections such as the bid-ask effect and non-synchronous trading days. Data are extracted from MSCI DataStream International.

### *- Instruments for the time-varying integration parameters*

Fluctuations in the regional stock market constitute a source of systematic risk in the context of an ICAPM model with partial integration. The theory suggests that this risk is relevant and priced; so we hinted a number of instrumental variables that may help to describe prices of risk. Two information variables are used in this study to capture the evolution of regional market integration. We use the level of stock market development (SMD) and the level of market openness (IMO).

- The level of stock market development: According to Levine and Zervos (1996), Bekaert & Harvey (1995, 1997), larger stock markets reduce information asymmetry, improve liquidity and increase potential opportunities for risk diversification. Like these authors, we have retained market capitalisation divided by GDP\* as a measure relative to stock exchange size.
- The degree of market openness: is measured by the ratio of imports plus exports to GDP. This variable is computed using data from MSCI, International Finance Corporation, and Datastream International. Trade liberalization is commonly considered as a factor of convergence between markets as well as a key element for the elaboration of international development strategy. This liberalization process has sharply accelerated in a number of emerging market countries during the early 1980s in order to deal with the lack of resources available to finance economic growth, and to remedy the poor performance of their financial markets. Bekaert and Harvey (2000), Bhattacharya and Daouk (2002), and Rajan and Zingales (2003) document that higher degree of market openness led to increase the exposure of national markets to global risk factors. Thus, as the markets became more open to foreign trade and capital flows, their level of economic integration would rise, and asset exchanges became significant. Accordingly, the degree of market openness can be a potential factor in promoting financial integration.

## **3. Empirical results**

Table 1 presents the descriptive statistics for stock market and the REER. The average stock return is negative with the negative skewness coefficient, denoting that the returns distributions are skewed toward the left and that the probability of observing extreme negative returns is higher than that of a normal distribution. The kurtosis coefficient is

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\* Data relative to GDP are generally biannual. Here, we have transformed them into monthly data using a linear interpolation method.

significant, and greater than three, and thus reveal the leptokurtic behavior of returns distributions. Altogether, the non-normality of returns series is clearly confirmed by the Jarque-Bera test. Besides, the Engle (1982) test highlights the existence of ARCH effects in all the returns series, which obviously supports our decision to model the conditional volatility of returns by a GARCH-type process.

**Table 1 – Descriptive statistics of return series**

	Mean (%)	Std. dev. (%)	Skewness	Kurtosis	ARCH(6)
JRETURN	0.855	2.563	-0.520	4.312	45.224 <sup>+++</sup>
RRETURN	0.722	2.289	-0.713	4.221	37.221 <sup>+++</sup>
REER	0.211	22.072	-0.512	4.843	30.044 <sup>+++</sup>

Notes: ARCH(6) is the empirical statistics of the Engle (1982)'s test for the 6<sup>th</sup> order of ARCH effects.

<sup>+++</sup> indicate that the null hypothesis of no ARCH effects is rejected at the 1% level.

Table 2 reports the obtained results as well as the basic integration measure statistics estimated. Overall, the results confirm the identification of driving factors for integration as its dynamics is significantly explained by the selected variables whatever the market.

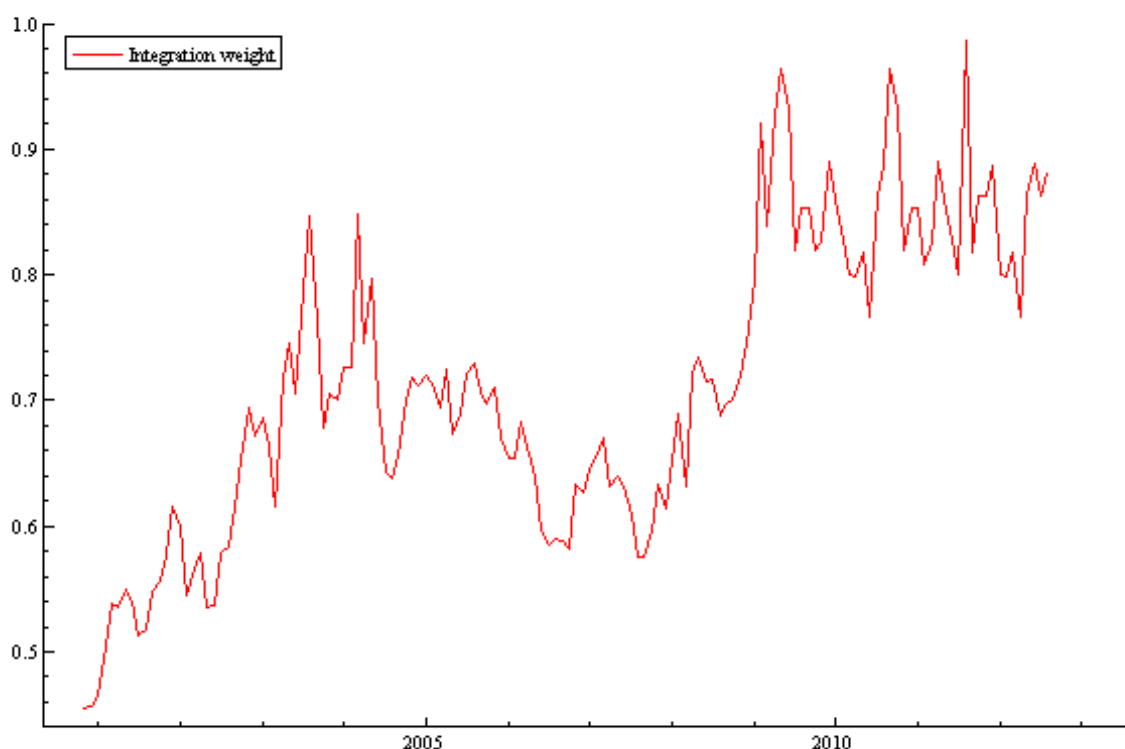
**Table 2. Dynamics of regional integration**

<i>Panel A – Determinants of market integration</i>	Constant	IMO	SMD
Japan	0.273*** (0.012)	0.245*** (0.010)	0.330*** (0.030)
<i>Panel B – Levels of market integration</i>	$\Theta$ mean	$\Theta_{\max}$	$\Theta_{\min}$
Japan	0.511*** (0.021)	0.790*** (0.032)	0.361*** (0.011)

Notes: The numbers in parentheses are standard deviations. \*\*\* indicate significance at the 1% rate.

In Figure 1 we depict the time-paths of regional financial integration measure. The Japan stock market shows a high level of regional integration. Its process of financial integration has begun with structural reforms aimed at stimulating the private sector and opening markets to foreign investors in the late 1980s. A close inspection of the integration patterns for this region indicates a level of integration greater than 0.50 during crisis period (2001-2002), and a sharp increase in the level of integration beginning in 2004. The rise in the level of financial integration during the recent period can be explained by the greater openness of the Japan to foreign trade, high growth rates, and the impacts of international financial shocks. According to Bormann et al. (1995), growth seems to be the main factor contributing to strengthening the regional and global integration of Asian countries. The economic success of Japan and the newly-industrialized countries has encouraged private firms to invest in the developing countries in the region and thereby improves the dynamics of regional financial markets.

**Figure 1. Time-varying market integration**



This integration must be interpreted as the result of the commercial dynamism generated by the implementation of free trade agreements with Asia Pacific, and the extension of these agreements to a wider format (ASEAN +3 or ASEAN +5). It is also linked to the dynamism of Asian financial centers and the concentration of transactions on a limited number of deregulated financial markets enjoying a very good reputation (Tokyo, Shanghai, Hong Kong, Seoul).

There has been almost thirty years since the establishment of an Asian trading bloc, long-term trend that confirms the importance of regionalism in globalization. However, we note a discrepancy between trading blocs, currency blocs and financial blocks in Asia. Trade flows are more intense among Asian countries. Capital flows are particularly strong between Japan and the Asia pacific countries. But, although the yen is increasingly used in the wording of the debt, and to a lesser extent, in the wording of transactions, there is no East Asian currency bloc that would ensure a stable exchange rate towards the yen.

The rapprochement in 2007 between the Singapore Exchange and the Tokyo Stock Exchange foreshadows probably more pronounced movement of reconciliation of all Asian markets. Japan remains a reference power in Asia because of the size of its GDP and because the yen could potentially play a more important role for the stabilization of exchange rates (Frankel, 1993). There is from this point of view an important difference between Japan and South Korea, on the one hand, and China on the other (Azad, 2009).

## 5. Conclusion

We developed a conditional ICAPM in the presence of exchange rate risk to study the dynamics of financial integration. Our empirical analysis is conducted on the basis of a nonlinear framework, which relies on the multivariate DCC-GARCH model. By allowing the prices of risk and the level of market integration to vary through time, we show that Japan experienced increases in the degree of integration, which reached levels below 60% over recent sub-periods.

The increasing integration into regional financial markets alone is unlikely to provide a sound ground for a currency union in Asia at this stage, but improvement in welfare gains in the Asian economies by means of further risk sharing is possible. We can expect a rebalancing strategies exchange rates of Asian countries towards greater stability vis-a-vis the yen and the adoption by the Asian exchange rate regimes more flexible.

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